applied until the actual plastication time is equal to the desired plastication time. In the meantime, a melt temperature controller **44** has been setting pressure control valve **37** to maintain the temperature sensed by temperature transducer **33** at a predetermined value. The back pressure necessary to achieve that temperature is measured by the back pressure transducer **35,** which provides a signal to computer **39** through melt temperature controller **44.**

Thus, computer **39** continually receives information from the injection molding machine and adjusts operating conditions so as to maintain the shot size and plastication time constant for the steady-state condition. Additionally, the control system also maintains melt temperature at the desired value by controlling the back pressure applied to the screw. It can thus be seen that any changing condition will be immediately reflected in corrections to the system to maintain the operation thereof at the predetermined levels. The net result is that the parts produced by an injection molding machine which includes the control system of the present invention are of much more uniform, high quality than if the control of the machine was accomplished manually. Furthermore, the time for setting up the machine to the predetermined operating conditions is significantly reduced since the control automatically compensates for differences in measured values and also any interaction effects which may take place when one variable is changed.

While particular embodiments of the invention have been illustrated and described it will be apparent to those skilled in the art that various changes and modifications can be made without departing from the spirit and scope of the invention and it is intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

What is claimed is:

1. A method of controlling the operation of an injection molding machine which includes a plastication system comprising a plastication screw rotatably and translatably positioned within a barrel, said method comprising:

a. rotating said screw at a constant speed until the desired volume of plasticated material has been processed;

b. measuring the plastication time within which said screw has been rotated to provide said desired volume of plasticated material;

c. comparing the measured plastication time with a desired plastication time and generating a time correction signal proportional to the difference therebetween;

d. computing a new screw rotational speed for the next succeeding operating cycle based on said time correction signal to provide the desired volume of plasticated material within the desired plastication time.

2. The method of claim **1** including the additional step of applying a back pressure to said rotating screw to maintain the temperature of said plasticated material at a predetermined level.

3. The method of claim **1** wherein said speed computation is based on the following formula:

$$N = A\ X_s/t_p\ [\ B + P_b\ ]$$

where N is the screw rotational speed in rpm X_s is the desired shot size in inches of screw retraction t_p is the calculated trial plastication time in seconds P_b is the back pressure on the screw in psi and A and B are constants for a given screw and material.

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